

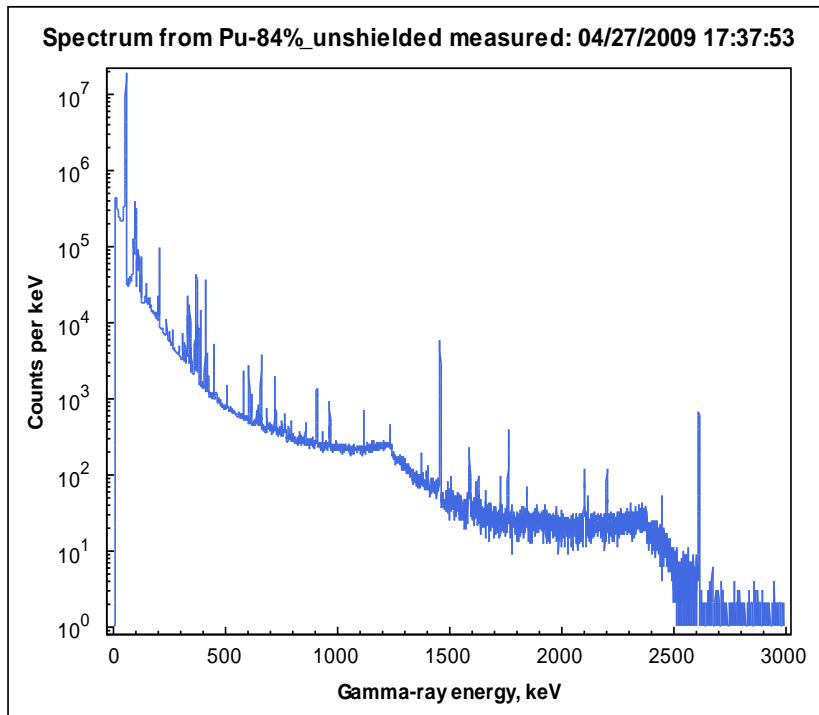
The Nucleonica Gamma Library

www.jrc.ec.europa.eu

Serving society
Stimulating innovation
Supporting legislation

Introduction

- Each gamma-emitting isotope emits photons with a unique set of gamma energies (“gamma signature” or “fingerprint”)

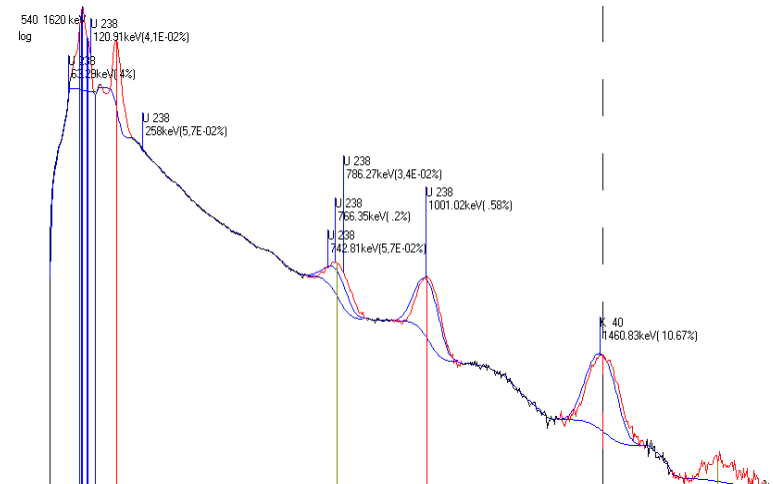


A gamma library is a set of gamma energies with corresponding emission probabilities, emitted by one or more isotopes

Spectrum of Pu, with 84 % of ^{239}Pu


















Introduction

- Various gamma-spectrometric software codes (e.g., ORTEC Gammavision, Canberra Genie-200, WESPA) use libraries to
 - Identify peaks in the spectrum
 - Calibrate the instruments
 - Evaluate the activities of the nuclides
 - Etc.
- The libraries can be created using a range of commercial software, but usually the underlying databases may not be up to date with the most recent nuclear data.

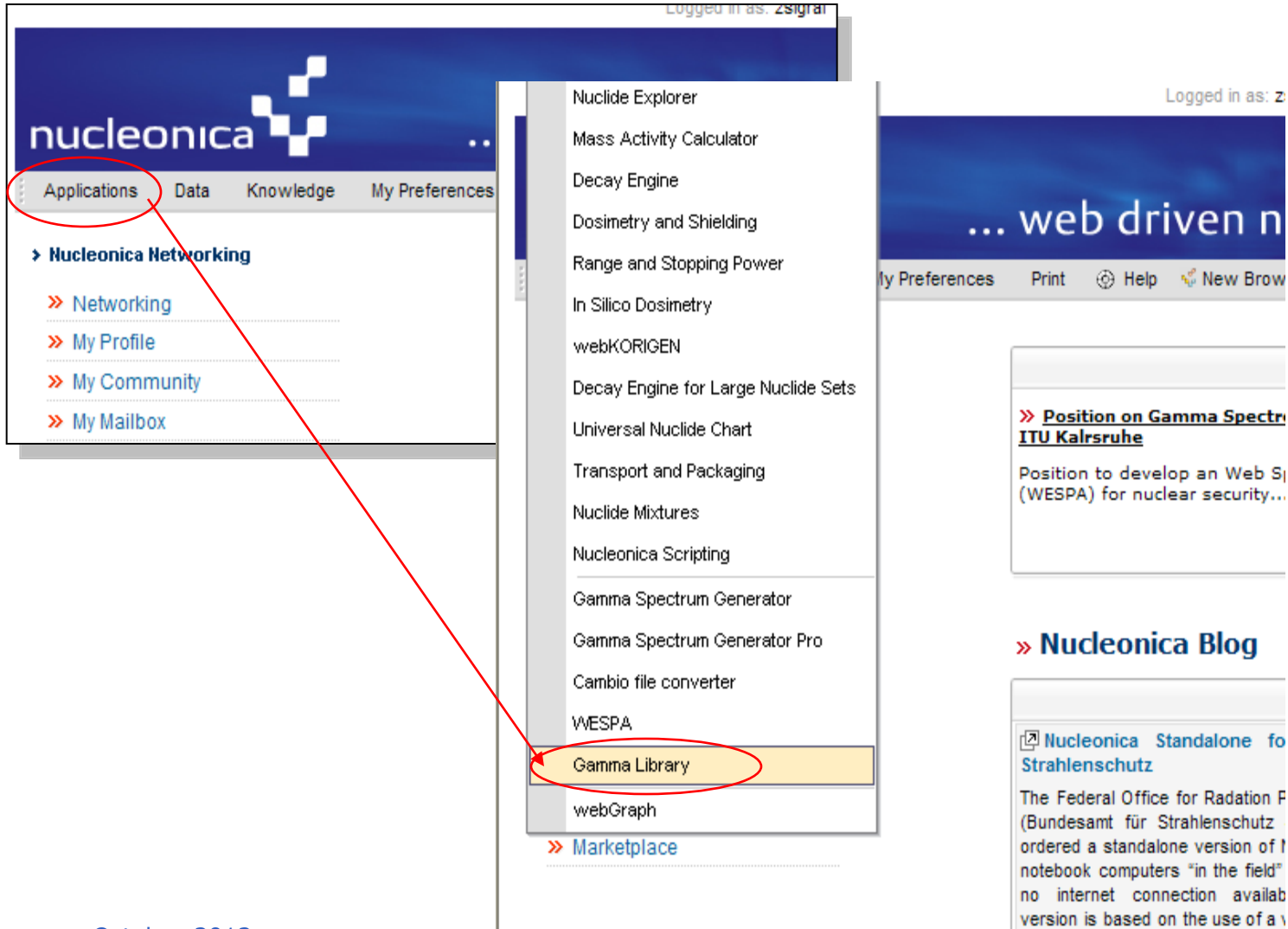


Introduction

- The Nucleonica gamma library module provides a web-based interface for library creation.
- Spectral data can be chosen from the latest internationally evaluated nuclear data in the Nucleonica, 8th Table of Isotopes, or JEFF3.1 databases.
- The libraries can be saved as text files (for use in Nucleonica and other applications) and some proprietary formats (e.g. GammaVision).
- The libraries created in Nucelonica can be **downloaded to PC** (currently two formats are supported):
 - ORTEC Gammavision
 - Identify (WESPA)

ID	Name	Date Modified	Download		Delete
	(Create a new Library)				
22	Np	10.05.2011, 09:54:09			
42	Gotcu-AmPu02	03.03.2011, 08:58:22			
23	U-Age-U232	15.02.2011, 14:47:56			
21	Am, Pu	18.01.2011, 10:50:38			
19	Am-241	18.01.2011, 10:21:57			
66	Calibration Sources	19.08.2010, 13:13:31			
67	Medical Library	08.07.2010, 16:15:27			
Total:	7		Page 1 / 1		

Accessing the Gamma Library module



The screenshot displays the Nucleonica web application interface. The top navigation bar includes 'Applications', 'Data', 'Knowledge', and 'My Preferences'. The 'Applications' menu is expanded, showing a list of modules: Nuclide Explorer, Mass Activity Calculator, Decay Engine, Dosimetry and Shielding, Range and Stopping Power, In Silico Dosimetry, webKORIGEN, Decay Engine for Large Nuclide Sets, Universal Nuclide Chart, Transport and Packaging, Nuclide Mixtures, Nucleonica Scripting, Gamma Spectrum Generator, Gamma Spectrum Generator Pro, Cambio file converter, WESPA, **Gamma Library** (highlighted with a red circle), and webGraph. A red arrow points from the 'Applications' tab to the 'Gamma Library' module. The right sidebar contains a section titled 'Position on Gamma Spectroscopy' and a 'Nucleonica Blog' section.

Logged in as: zsigrai

nucleonica

Applications Data Knowledge My Preferences

» Nucleonica Networking

- » Networking
- » My Profile
- » My Community
- » My Mailbox

Nuclide Explorer

Mass Activity Calculator

Decay Engine

Dosimetry and Shielding

Range and Stopping Power

In Silico Dosimetry

webKORIGEN

Decay Engine for Large Nuclide Sets

Universal Nuclide Chart

Transport and Packaging

Nuclide Mixtures

Nucleonica Scripting

Gamma Spectrum Generator

Gamma Spectrum Generator Pro

Cambio file converter

WESPA

Gamma Library

webGraph

» Marketplace

Logged in as: z

... web driven n

My Preferences Print Help New Brow

» **Position on Gamma Spectroscopy**
ITU Karlsruhe

Position to develop an Web S
(WESPA) for nuclear security...

» **Nucleonica Blog**

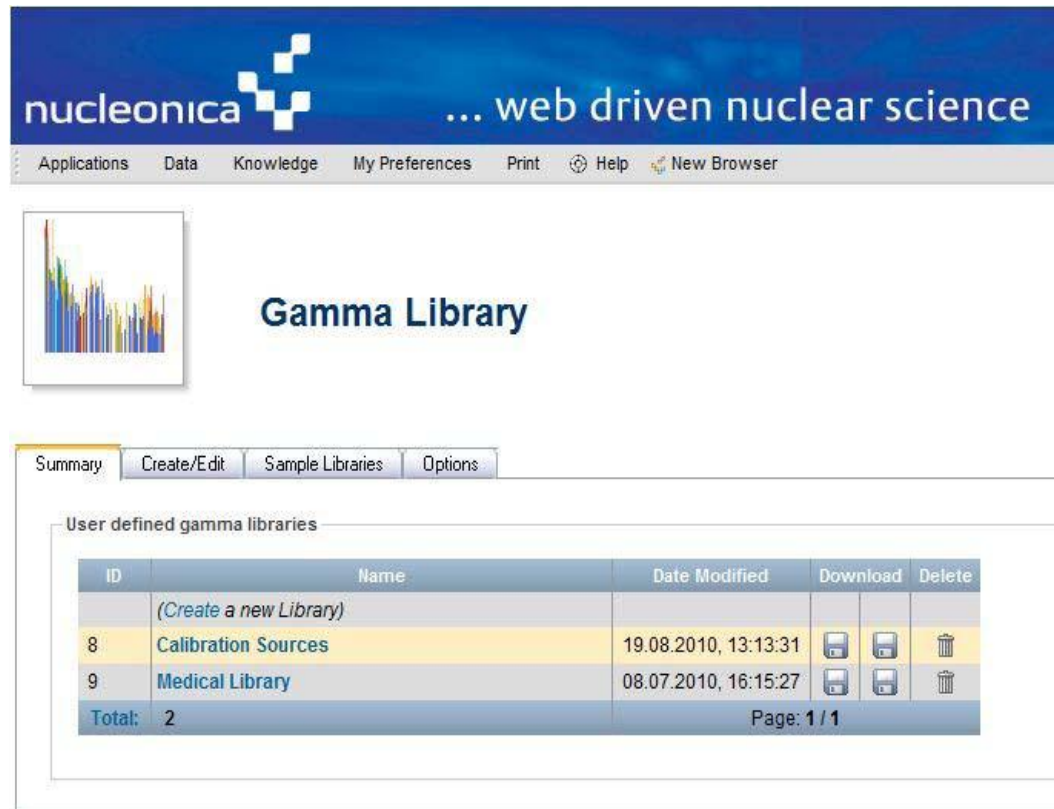
» **Nucleonica Standalone for Strahlenschutz**

The Federal Office for Radiation P
(Bundesamt für Strahlenschutz
ordered a standalone version of I
notebook computers "in the field"
no internet connection availab
version is based on the use of a




October-2012

Welcome to the Library module!

- Create, edit, download, delete your own libraries



The screenshot displays the 'nucleonica' web interface, featuring a blue header with the text '... web driven nuclear science'. Below the header is a navigation bar with links: Applications, Data, Knowledge, My Preferences, Print, Help, and New Browser. The main content area is titled 'Gamma Library' and includes a small icon of a bar chart. Below this, there are tabs for 'Summary', 'Create/Edit', 'Sample Libraries', and 'Options'. The 'Summary' tab is active, showing a table of 'User defined gamma libraries'. The table has columns for ID, Name, Date Modified, Download, and Delete. It lists two libraries: 'Calibration Sources' (ID 8, Date Modified: 19.08.2010, 13:13:31) and 'Medical Library' (ID 9, Date Modified: 08.07.2010, 16:15:27). A 'Total: 2' row is at the bottom of the table. The page number 'Page: 1 / 1' is displayed at the bottom right of the table area.

ID	Name	Date Modified	Download	Delete
	(Create a new Library)			
8	Calibration Sources	19.08.2010, 13:13:31		
9	Medical Library	08.07.2010, 16:15:27		
Total:	2			

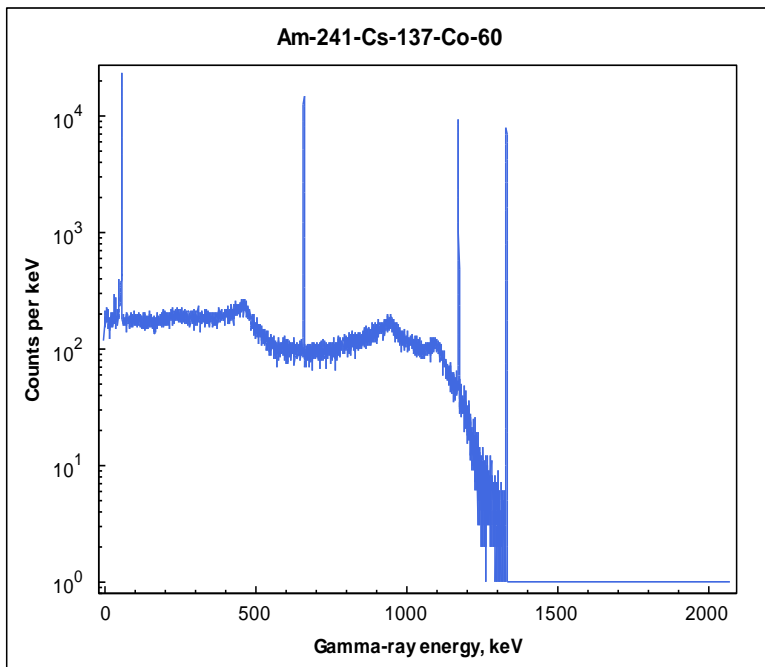
Page: 1 / 1

Example

Let's create a library with two nuclides!

- ^{134}Cs
- ^{137}Cs

(Create a new Library)



October-2012





nucleonica ... web driven nuclear science

Applications Data Knowledge My Preferences Print Help New Browser

Gamma Library

Summary Create/Edit Sample Libraries Options

User defined gamma libraries

ID	Name	Date Modified	Download	Delete
	(Create a new Library)			
8	Calibration Sources	19.08.2010, 13:13:31		
9	Medical Library	08.07.2010, 16:15:27		
Total: 2		Page: 1 / 1		

Example

Summary

Create/Edit

Sample Libraries

Options

Name: Cs134+Cs137

Description: Test library

Current Chart: Karlsruhe

Cs

134

☒ Consider daughters

Peak Selection

☐ All Peaks

☒ High resolution (HPGe)

☐ Low resolution (NaI)

☐ Deselect all

Emission type

☒ Gamma lines

☒ X-Rays

Add Nuclide

Save

Library Nuclides

Nuclide	Halflife	Delete
0 Nuclide	Page: 0 / 0	

Daughters from selected Nuclide

Nuclide	Halflife
0 Daughter	Page: 0 / 0

Radiations from selected Nuclide

Energy	Emission Probability	Type
0 / 0 Peak	Page: 0 / 0	

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
Total:	0 Peak	Page: 0 / 0	

Give a name to the library

Enter a description

List of nuclides

Editing area

The created library

October-2012

Example

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs134

2.91 h 2.07 y

Cs

134

☒ Consider daughters

Peak Selection

☐ All Peaks
☒ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type

☒ Gamma lines
☒ X-Rays

Add Nuclide

Save

Library Nuclides

Nuclide	Halflife	Delete
0 Nuclide	Page: 0 / 0	

Radiations from selected Nuclide

Energy	Emission Probability	Type
0 / 0 Peak	Page: 0 / 0	

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
Total: 0 Peak			Page: 0 / 0

Daughters from selected Nuclide

Nuclide	Halflife
0 Daughter	Page: 0 / 0

Select a nuclide

Add Nuclide

Example

Summary

Create/Edit

Sample Libraries

Options

Name: Cs134+Cs137
Description: Test library

Current Chart: Karlsruhe

Cs
134
☒ Consider daughters

Cs134

2.91 h 2.07 y

Add Nuclide

☐ All Peaks
☒ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type
☒ Gamma lines
☒ X-Rays

Library Nuclides

Nuclide	Half-life	Delete
55 Cs 134	2.0648 y	
1 Nuclide	Page: 1 / 1	

Daughters from 55 Cs 134

Nuclide	Half-life
0 Daughter	Page: 0 / 0

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.04792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31.82	2.364e-3	X-Ray
36.4	1.587e-3	X-Ray
4.47	1.44e-3	X-Ray

⇒

⇐

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
Total:	0 Peak		Page: 0 / 0

Click to select/deselect

Example

Summary

Create/Edit

Sample Libraries

Options

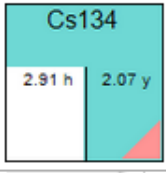
Name: Cs134+Cs137
Description: Test library

Current Chart: Karlsruhe

Cs
134
☒ Consider daughters

Peak Selection
☐ All Peaks
☒ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type
☒ Gamma lines
☒ X-Rays



Add Nuclide

Library Nuclides

Nuclide	Half-life	Delete
55 Cs 134	2.0648 y	
1 Nuclide	Page: 1 / 1	

Daughters from 55 Cs 134

Nuclide	Half-life
0 Daughter	Page: 0 / 0

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31.82	2.364e-3	X-Ray
36.4	1.587e-3	X-Ray
4.47	4.44e-3	X-Ray

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
Total:	0 Peak		Page: 0 / 0

Click to add selected peaks to library

Example

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs

134

Consider daughters

Peak Selection

☐ All Peaks
 ☒ High resolution (HPGe)
 ☐ Low resolution (NaI)
 ☐ Deselect all

Emission type

☒ Gamma lines
 ☒ X-Rays

Add Nuclide

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
1 Nuclide Page: 1 / 1		

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter Page: 0 / 0	

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31.82	2.364e-3	X-Ray
36.4	1.587e-3	X-Ray
4.47	1.141e-3	X-Ray
242.8	2.100e-4	Gamma
326.5	1.400e-4	Gamma
847	3.000e-6	Gamma

Save

⇒

⇐

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

Radiations
added to the
library

OCTOBER 2012

Joint
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Centre

Example

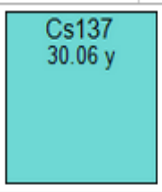
Summary

Create/Edit

Sample Libraries

Options

Name: Cs134+Cs137
Description: Test library

Current Chart:
Karlsruhe


Cs 137
☒ Consider daughters

Peak Selection
☐ All Peaks
☐ High resolution (HPGe)
☐ Low resolution (NaI)
☒ Deselect all

Emission type
☒ Gamma lines
☒ X-Rays

Cs 137
☒ Consider daughters

Add Nuclide

Cs 137
☒ Consider daughters

Add Nuclide

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
1 Nuclide Page: 1 / 1		

Radiations from selected Nuclide

Energy	Emission Probability	Type
0 / 0 Peak Page: 0 / 0		

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter Page: 0 / 0	

Example

Summary

Create/Edit

Sample Libraries

Options

Name: Cs134+Cs137
Description: Test library

Current Chart: Karlsruhe

Cs 137
30.06 y

Cs 137
30.06 y

Add Nuclide

Cs 137
30.06 y

☒ Consider daughters

Peak Selection

☐ All Peaks
☐ High resolution (HPGe)
☐ Low resolution (NaI)
☒ Deselect all

Emission type

☒ Gamma lines
☒ X-Rays

Save

Library Nuclides

Nuclide	Half-life	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
2 Nuclides		Page: 1 / 1

Radiations from 55 Cs 137

Energy	Emission Probability	Type
283.5	5.800e-6	Gamma
0 / 1 Peak		Page: 1 / 1

Daughters from 55 Cs 137

Nuclide	Half-life
56 Ba 137m	2.55 m
1 Daughter	

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks	Page: 1 / 1	

Cs-137 added

Click to add daughter

Example

Summary

Create/Edit

Sample Libraries

Options

Name: Cs134+Cs137
Description: Test library

Current Chart: Karlsruhe

Cs 137
30.06 y
☒ Consider daughters

Peak Selection
☐ All Peaks
☒ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type
☒ Gamma lines
☒ X-Rays

Add Nuclide

Library Nuclides

Nuclide	Half-life	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	

3 Nuclides Page: 1 / 1

Radiations from 56 Ba 137m

Energy	Emission Probability	Type
661.7	0.9007	Gamma
32.19	0.03815	X-Ray
31.82	0.02068	X-Ray
36.4	0.01388	X-Ray
4.47	0.01042	X-Ray

4 / 5 Peaks Page: 1 / 1

Daughters from 56 Ba 137m

Nuclide	Half-life
0 Daughter	Page: 0 / 0

Save

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

Ba-137 added

Example

Summary

Create/Edit

Sample Libraries

Options

Name: Cs134+Cs137
Description: Test library

Current Chart: Karlsruhe

Cs 137
30.06 y

Cs 137
Consider daughters

Peak Selection
☐ All Peaks
☐ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type
☒ Gamma lines
☒ X-Rays

Save!

Select only one peak for Ba137

Add Nuclide

Library Nuclides

Nuclide	Half-life	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	
3 Nuclides	Page: 1 / 1	

Daughters from 56 Ba 137m

Nuclide	Half-life
0 Daughter	Page: 0 / 0

Radiations from 56 Ba 137m

Energy	Emission Probability	Type
661.7	0.9007	Gamma
32.19	0.03815	X-Ray
31.82	0.02068	X-Ray
36.4	0.01388	X-Ray
4.47	0.01042	X-Ray
1 / 5 Peak	Page: 1 / 1	

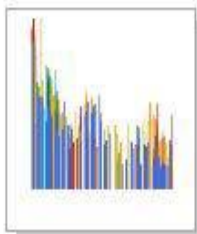
Save

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks	Page: 1 / 1	

Click to add selected peak to library

Example



Gamma Library





Summary

The created library shows up in the list



Summary Create/Edit Sample Libraries Options

User defined gamma libraries

ID	Name	Date Modified	Download	Delete
	(Create a new Library)			
8	Calibration Sources	19.08.2010, 13:13:31		
9	Medical Library	08.07.2010, 16:15:27		
Total:	2			

Page: 1/1

Download or delete library

How to remove peaks from the library?

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs

137

Consider daughters

Cs137

30.06 y

Add Nuclide

Peak Selection

☐ All Peaks
 ☒ High resolution (HPGe)
 ☐ Low resolution (NaI)
 ☐ Deselect all

Emission type

☒ Gamma lines
 ☒ X-Rays

Save

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	
3 Nuclides		Page: 1 / 1

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter	

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31.82	2.364e-3	X-Ray
36.4		

Editing area

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

The created library

List of nuclides

October-2012

Joint Research Centre

How to remove peaks from the library?

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs137

30.06 y

Add Nuclide

Cs

137

☒ Consider daughters

Peak Selection

☐ All Peaks
☒ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type

☒ Gamma lines
☒ X-Rays

Save

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	
3 Nuclides Page: 1 / 1		

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter Page: 0 / 0	

1. Select a nuclide (e.g. Cs134)

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31.82	2.364e-3	X-Ray
36.4	1.587e-3	X-Ray

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

List of nuclides

October-2012

Joint
Research
Centre

How to remove peaks from the library?

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs137

30.06 y

Cs

137

Consider daughters

Peak Selection

☐ All Peaks
 ☐ High resolution (HPGe)
 ☐ Low resolution (NaI)
 ☐ Deselect all

Emission type

☒ Gamma lines
 ☒ X-Rays

Add Nuclide

Save

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	
3 Nuclides		Page: 1 / 1

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter	
Page: 0 / 0	

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31		
36		
4.47	1.141e-3	X-Ray
242.5	2.100e-4	Gamma

Editing area

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

How to remove peaks from the library?

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs137

30.06 y

Cs

137

Consider daughters

Peak Selection

☐ All Peaks
☐ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type

☒ Gamma lines
☒ X-Rays

Add Nuclide

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	
3 Nuclides	Page: 1 / 1	

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter	Page: 0 / 0

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31		
36		
4.47	1.141e-3	X-Ray
242.5	2.100e-4	Gamma

Editing area

Save

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	569.32	0.1539	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
55 Cs 134	1.168e+3	0.01792	Gamma
55 Cs 134	475.34	0.015	Gamma
55 Cs 134	1.039e+3	9.910e-3	Gamma
Total:	9 Peaks		Page: 1 / 1

The created library

4. Copy new peak selection to the library

How to remove peaks from the library?

Summary

Create/Edit

Sample Libraries

Options

Name:

Cs134+Cs137

Description:

Test library

Current Chart:

Karlsruhe

Cs137

30.06 y

Cs

137

☒ Consider daughters

Peak Selection

☐ All Peaks
☐ High resolution (HPGe)
☐ Low resolution (NaI)
☐ Deselect all

Emission type

☒ Gamma lines
☒ X-Rays

Add Nuclide

Library Nuclides

Nuclide	Halflife	Delete
55 Cs 134	2.0648 y	
55 Cs 137	30.1671 y	
56 Ba 137m	2.55 m	
3 Nuclides		Page: 1 / 1

Daughters from 55 Cs 134

Nuclide	Halflife
0 Daughter	

Radiations from 55 Cs 134

Energy	Emission Probability	Type
604.69	0.9763	Gamma
795.84	0.8552	Gamma
569.32	0.1539	Gamma
801.93	0.08700	Gamma
563.23	0.08380	Gamma
1.365e+3	0.03015	Gamma
1.168e+3	0.01792	Gamma
475.34	0.015	Gamma
1.039e+3	9.910e-3	Gamma
32.19	4.362e-3	X-Ray
31.82	2.364e-3	X-Ray
36.4	1.587e-3	X-Ray

Save

Radiation Library

Nuclide	Energy (keV)	Emission Probability	Type
55 Cs 134	604.69	0.9763	Gamma
55 Cs 134	795.84	0.8552	Gamma
55 Cs 134	801.93	0.08700	Gamma
55 Cs 134	563.23	0.08380	Gamma
55 Cs 134	1.365e+3	0.03015	Gamma
Total:	5 Peaks		Page: 1 / 1

5. The new selection replaces the old peaks from Cs134 in the library

Setting the options

Options

Summary Create/Edit Sample Libraries **Options**

Database: Nucleonica

Min. branching ratio for daughters: 0.01

HPGe

Peak selection: high resolution detectors

Min. Energy 30 keV

Max. Energy 3000 keV

Min. Emission probability 1 % of E.P. of strongest line

Min. Emission probability 1.5 % of E.P. of strongest higher energetic line

NaI

Peak selection: low resolution detectors

Min. Energy 30 keV

Max. Energy 3000 keV

Min. Emission probability 2 % of E.P. of strongest line

Min. Emission probability 5 % of E.P. of strongest higher energetic line

Select database

Energy range
(absorbers!)

Emission
probability settings
for default peak
selection

To make a library:

First look at the spectrum

Then guess which nuclides can be expected

Create a new library and start adding nuclides and energies

For more
info look
at the
Nucleonica
Wiki:



Help



October-2012

Exercise

Create a gamma library for a set of calibration sources, with the energies given below:

^{241}Am

59.54 keV

^{137}Cs ($^{137\text{m}}\text{Ba}$)

661.7 keV

^{60}Co

1173 and 1332 keV